

# **Preoperative Anxiety and Depression among Parents of Children undergoing Anesthesia and Surgical Operations in a Tertiary Hospital in Port Harcourt, Nigeria**

## **Abstract**

**Introduction:** In spite of pediatric surgical interventions being potentially curative, and the advancement in pediatric anesthesiology, the fear of morbidity and mortality still abounds among parents. Anxiety and depressive symptoms among parents of children undergoing anesthesia and surgery could threaten postoperative recovery. This study therefore assessed the prevalence and factors of preoperative parental anxiety and depression.

**Methodology:** This was a cross-sectional study comprising of parents whose children were scheduled for surgery at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. Preoperative anxiety and depression were the dependent variables, and were determined based on the Hamilton Anxiety Depression Scale (HADS), a validated and reliable tool. Socio-demographic and clinical-related variables comprised the independent variables. Bivariate and multivariate analyses were performed at 0.05 significant level.

**Results:** The study comprised a total of 100 parents whose children were undergoing surgical operations. The prevalence of preoperative parental anxiety and depression were 58.0% (95% CI: 48.3-67.7%) and 49.0% (95% CI:39.2-58.8%) respectively. Prevalence of preoperative parental anxiety was significantly higher among emergency surgeries (100.0%) in comparison to elective surgeries (56.5%) (p-value=0.034). The odds of preoperative parental anxiety was 50% lower with increasing existing number of children (AOR=0.505;95%CI:0.258-0.991). Parental depression had significantly lower odds with administration of general anesthesia (AOR= 0.022;

95%CI:0.001-0.701), and having higher existing number of children (AOR= 0.505; 95%CI:0.258-0.991).

**Conclusion:** The prevalence rates of preoperative anxiety and depression in the study setting are high. The findings highlight the need for evaluation of parental anxiety and depression pre-operatively especially those with single or lower number of children.

**Key words:** parental anxiety, depression, pediatric surgeries, mental health

## Introduction

Surgical operation and induction of anesthesia among pediatric population are common life-saving procedures in medical practice. Notwithstanding the curative benefits, they constitute a fearful event for children and their parents.<sup>1</sup> Preoperative anxiety is the feeling of nervousness, uneasiness, worry and tension related to an impending surgical experience.<sup>2</sup> Preoperative depression could be described as the loss of interest or pleasure in daily activities, low mood and aversion to activity, feelings of worthlessness or low sense of well-being related to a surgical procedure.<sup>3</sup>

Preoperative anxiety among children has been investigated in a scoping review, and found to be as high as 75.4%.<sup>4</sup> Parents are also susceptible to preoperative anxiety and depressive feelings, which could negative impact on their care-giving roles.<sup>5</sup> Preoperative anxiety in parents has been linked to anxiety among their child undergoing anesthesia and surgical operations.<sup>6</sup> Additionally, higher postoperative pain scores have been reported among children of parents with anxiety due to surgical procedure.<sup>7</sup> Notably, preoperative parental anxiety and depression without medical intervention have been shown to persist several months after the surgical procedure and compromises their optimal wellbeing.<sup>8</sup>

Preoperative parental anxiety and depression is not uncommon. The review of literature reveals that up to half of parents of children undergoing anesthesia and surgical operations experience parental anxiety or psychological morbidity due to perceived fear of morbidity and mortality.<sup>5,9,10,11</sup> The findings of preoperative parental psychological morbidities could adversely impinge on the postop recovery phase of the children.<sup>7</sup> However, several research has focused on addressing preoperative anxiety among children, with limited studies on the parental aspect. A previous study in Port Harcourt, Niger-Delta region of Nigeria examined psychological distress among spouses of women undergoing surgical procedures and noted a high prevalence among this group of caregivers.<sup>12</sup> The index study is among the first in the Niger-Delta region to assess preoperative anxiety and depression among parents of children scheduled for anesthesia and surgery. This study seeks to provide evidence-based information for instituting measures to curtail preoperative parental anxiety and depression. Identifying category of parents who are at greater risk of experiencing preoperative psychological morbidity could help professional team provide required intervention to optimize clinical outcome.<sup>13</sup>

The study aimed to determine the prevalence of preoperative anxiety and depression among parents of children undergoing anesthesia and surgical procedures. Also, factors associated with preoperative parental anxiety and depression were explored.

## **Methodology**

### *Study area*

The study was conducted in the University of Port Harcourt Teaching Hospital (UPTH), Rivers State, Niger-Delta region of Nigeria, West Africa. UPTH is a tertiary hospital providing health care to people in Rivers State and neighboring states in the region. It has a total of 17 clinical

departments. Pediatric Surgical Department undertakes surgical operations weekly, with an average of 3-4 cases.

#### *Study design and study population*

This was a cross-sectional study. The study population comprised of parents of children booked for surgical operations who were in American Society of Anesthesiologists (ASA) physical status classification 1 or 2. Parents with prior history of anxiety and depression were excluded from the study. One of the parents filled the questionnaire if both parents were available.

#### *Sample size calculation and sampling*

The minimum sample size was calculated using the formula for cross-sectional design.<sup>14</sup> A sample size of 100 was obtained based on alpha level of 0.05, prevalence of preoperative anxiety of 51% from a study by Osuji et al<sup>9</sup> and precision of 0.1. Parents of children scheduled for surgical operation were consecutively selected in the study based on the eligibility criteria till the sample size was attained.

#### *Data collection*

Data were collected over a one-year period, from January to December 2022. Data collection was done using a self-administered pre-tested structured tool comprising of sections on socio-demographic, clinical and the Hamilton Anxiety Depression Scale (HADS). The study questionnaire was administered to the parents within six hours of the scheduled surgical operations after obtaining written informed consent.

Socio-demographic section comprised of age and sex of child undergoing surgery, parents age, category of parent (father/mother), marital status, education, employment status and income. The Clinical section comprised of type of anesthesia and type of surgical operation. HADS is a validated and reliable 14-item tool for assessing anxiety and depression.<sup>15,16,17</sup> It consists of two

7-item scales; anxiety and depression. The responses are graded on a four-point scale (0–3) resulting in scores on each scale from 0 to 21. Higher scores indicate greater anxiety or depression. A scale score of 8 or above (cut-off score) is considered as an indicator for clinically significant anxiety and depression on anxiety and depression scales respectively.<sup>17</sup>

#### *Data analysis*

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were performed using frequencies and proportions for categorical variables, while means and standard deviations were used for numerical variables. Differences in proportions was compared using Pearson's Chi square ( $X^2$ ) statistics or Fisher's exact test. Fisher's exact was used instead of  $X^2$  in crosstabulations that had expected cell value below five in twenty percent or more of the crosstab cells. Multivariate analysis employed binary logistic regression to identify predictors of parental anxiety and depression in the study. Adjusted odds ratios and the 95% confidence intervals were determined to measure the strength of association. A p-value of less than 0.05 was considered statistically significant.

## **Results**

### *Age characteristics of parents and children*

The study comprised a total of 100 parents whose children were undergoing anesthesia and surgical operations. The mean age( $\pm$ SD) of parents was  $37.4\pm 7.1$  years; median age was 38 years with an age range of 20-56 years. For the children, the mean age( $\pm$ SD) was  $4.2(\pm 3.8)$  years while the median age was 3 years with minimum and maximum ages of 50 days and 16 years respectively.

### *Indications for surgery*

The indications for the pediatric surgeries are presented in Table 1. Herniotomy/hydrocelectomy/herniorrhaphy was the most common indication for surgery (n=38; 38.0%). This was followed by uretostomy/urethroplasty (n=17; 17.0%) and adenotonsillectomy (n=9; 9.0%). Appendectomy, laparotomy, nephrectomy and osteotomy each had the lowest proportion of 2.0% (n=2).

### *Prevalence of preoperative parental anxiety and depression*

A total of 58 parents experienced preoperative parental anxiety (58.0%; 95% CI: 48.3-67.7%). Forty-nine of the 100 parents in the study had preoperative depression (49.0%; 95% CI: 39.2-58.8%).

### *Demographic/clinical-related variables and preoperative parental anxiety*

The comparison of demographic/clinical-related variables and parental anxiety is presented in Tables 2 and 3. There was no significant difference in the mean ages of children with parental anxiety and those without parental anxiety (p-value=0.906). Parents with preoperative anxiety were significantly older ( $38.3\pm 6.7$  years) in comparison to those without parental anxiety ( $35.2 \pm 7.1$  years) (p-value=0.039). Preoperative anxiety was observed in about two-thirds of fathers (66.7%) and about half of the mothers (53.1%) in the study. There was no significant difference

in the comparison of category of parent and parental anxiety (p-value=0.188). The proportion of parental anxiety was significantly higher among surgeries involving male children (64.4%) in comparison to those involving female children (40.7%) (p-value=0.033). Parents who were married (58.6%), had nil education (60%) or secondary education (60.0%), and employed (63.5%) had higher preoperative anxiety. Table 3 shows that mean number of children was higher among those with parental anxiety in comparison to those without parental anxiety ( $2.8 \pm 1.3$  versus  $2.4 \pm 1.2$ ; p-value=0.153).

Concerning clinical-related variables, the study showed that the prevalence of parental anxiety was significantly higher among emergency surgeries (100.0%) in comparison to elective surgeries (56.5%) (p-value=0.034). Parents of children for general anesthesia (56.5%) had lower prevalence of preoperative anxiety in comparison to those with other forms of anesthesia (66.7%)(p-value=0.461).

After adjusting for demographic/clinical-related variables in the logistic regression, the number of children showed significant association with parental anxiety (Table 4). The odds of parental anxiety was 50% lower as the number of children increases (Adjusted Odds Ratio=0.505; 95% CI:0.258-0.991).

#### *Demographic/clinical-related variables and preoperative parental depression*

The mean ages of children of parents with and without preoperative depression showed no significant difference (p-value=0.622). The mean ages of parents with and without preoperative depression were similar ( $37.3 \pm 7.0$  and  $36.8 \pm 7.0$  respectively) (p-value= 0.708). Prevalence of preoperative depression was higher among fathers than mothers (55.6% versus 45.3%; p-value=0.325). Higher prevalence of preoperative depression was observed among surgeries involving male children in comparison to female children (54.8% versus 33.3%; p-value=0.057).

Parents who were singles or separated/divorced/widowed had slightly higher prevalence of preoperative depression (50.0%) in comparison to married counterparts (49.4%) (p-value =1.000). Concerning educational level, parents with nil education had the highest prevalence of preoperative depression (60.0%) while those with secondary and tertiary levels had prevalence rates of 48.0% and 48.4% respectively (p-value=0.983). The prevalence of preoperative parental depression was highest among those who were employed (54.0%) in comparison to unemployed (51.5%) and students (25.0%)(p-value=0.220). (Tables 2 and 3)

After adjusting for demographic/clinical-related variables, the type of anesthesia and the existing number of children by parents in the study showed significant association with preoperative parental depression. The odds of experiencing parental depression were lower among parents of children receiving general anesthesia (Adjusted Odds Ratio= 0.022; 95%CI:0.001-0.701), and among those with higher number of children (Adjusted Odds Ratio= 0.505; 95%CI:0.258-0.991) as presented in Table 4.

## **Discussion**

This hospital-based cross-sectional study involving parents of children undergoing anesthesia and surgical operations found that 58% and 49% of them experienced preoperative anxiety and depression respectively. Emergency surgical operations and having lower number of children showed significantly higher risk for the occurrence of preoperative parental anxiety in the study. Whereas for preoperative depression, non-use of general anesthesia and lower number of children were the identified predictors.

The finding of our study regarding parental anxiety is in tandem with several studies,<sup>5,9,11,13,18</sup> which all reveal that parental anxiety due to an impending surgical operation is not uncommon. The risk of anesthetic and surgical complications with each surgery could make parents of

children scheduled for surgery vulnerable to preoperative anxiety. In a bid to address preoperative anxiety among parents, Franck and Spencer proposed the provision of detailed information about anesthetic procedures, risks, and personnel roles prior to the surgery.<sup>19</sup> Also, psychological preparation for parents of children undergoing anesthesia and surgeries has been proposed.<sup>20</sup> Psychological preparation denotes preparedness mentally and emotionally in order to abate anxiety and depressive levels; familiarize the patient and family with the procedure, and aid post operation adjustment.<sup>20</sup>

Preoperative parental depression was seldom studied in most of the previously available research, as parental anxiety alone was the focus. The inclusion of parental depression in the index study further enriches the existing literature. Also, the finding of preoperative parental depression reveals an experience of a greater psychological burden relative to that of parental anxiety. The finding of close to half of the parents (49%) in the study experiencing parental depression could be described as alarmingly high. Thus, this possibly uncovers the need for adoption of preoperative depression screening of parents of children undergoing surgical operations. The non-identification of depression and lack of subsequent care among affected parents could persist and hamper post-recovery phase of the children.

Concerning the determinants of parental anxiety and depression, the logistic regression models of parental anxiety and depression both found lower odds of anxiety and depression among parents with higher number of children. This finding therefore implies that higher odds of anxiety and depression occurs with lower number of children. Thus, having lower number of children or siblings carries greater risk of preoperative parental anxiety and depression, which is consistent with previous studies.<sup>21,22</sup> Hence, the existing number of children is a vital information in history taking by anesthesiologists/surgeons prior to undergoing anesthesia and surgical

operation among pediatric population. Preoperative anxiety and depression screening should be considered among parents with a single child/lower number of children.

Emergency surgical operations showed significant relationship with preoperative parental anxiety. This is possibly unsurprising due to the uneasiness and fear commonly observed in emergencies. The finding of type of anesthesia being related to preoperative parental depression in the index study highlights the importance of educating and counselling parents on anesthetic procedure that would be employed on their child. Some authors have advocated the presence of parents in the theatre to observe the ongoing anesthetic procedure of their child in a bid to address parental anxiety.<sup>1</sup>

Although some research noted that parents who were older, less educated, or mothers showed significant association with parental anxiety,<sup>5,13,18</sup> the index study however did not have sufficient evidence to assert such. However, our findings suggest that possible interventions targeted at curbing preoperative parental anxiety and depression be carried out regardless of the demographic characteristics of the parents. In the same vein, the age and sex of the child showed no significant relationship with parental preoperative anxiety and depression after controlling for other factors, which is consistent with previous research.<sup>10</sup>

The identified determinants of parental anxiety and depression do not reveal causality, but associations due to the cross-sectional nature of the study. Also, the adoption of a single center study could limit the external validity of the research findings, hence caution should be considered in the extrapolation of findings to wider settings. Nonetheless, further research could employ multicenter studies to widen the extent of generalizability of findings. Additionally, further research could adopt a longitudinal design to determine both preoperative and

postoperative parental anxiety and depression in order to provide richer information to guide interventions, policies and protocols.

## **Conclusion**

The findings of the index study highlight the need for preoperative anxiety and depression screening among parents whose children are undergoing anesthesia and surgical operations. Parents with single child or lower number of children had greater risk of experiencing preoperative anxiety and depression. Strategies targeted at reducing the burden of preoperative anxiety and depression could consider parents with single/lower number of children. Anesthesiologist and pediatric surgeons should collaborate with mental health team in order to ensure parents accompanying children for surgical operations receive required emotional and psychological care. Also, sufficient information on anesthesia and surgical procedures should be accurately communicated to the parents in manner that exudes confidence and calmness.

## **Ethical Approval and Consent**

The principles of ethics were upheld in the research. A written informed consent was obtained from the respondents prior to their inclusion into the study. Anonymity was upheld by using research numbers, and confidentiality of information was ensured in the study. The participation of parents in the study was voluntary. Non-withdrawal or non-participation of eligible parents in the study did not affect the surgery or postoperative care of their child.

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**Table 1: Indication for surgery among children of parents in the study**

<b>Indications for surgery</b>	<b>Frequency</b>	<b>Percent (%)</b>
Herniotomy/Hydrocelectomy/Herniorrhaphy	38	38.0
Uretostomy/Urethroplasty	17	17.0
Adenotonsillectomy	9	9.0
Excision Biopsy	6	6.0
Orchidopexy	6	6.0
Anorectoplasty	6	6.0
Cleft Lip Repair/Palatoplasty	4	4.0
Colostomy/Colostomy Repair	3	3.0
Incision and Drainage	3	3.0
Appendectomy	2	2.0
Laparotomy	2	2.0
Nephrectomy	2	2.0
Osteotomy	2	2.0
<b>Total</b>	<b>100</b>	<b>100.0</b>

**Table 2: Comparison of demographic/clinical related factors by parental anxiety and depression**

Variables	N	Parental Anxiety		Parental Depression	
		Yes n (%)/ Mean ± SD	No n (%)/ Mean ± SD	Yes n (%)/ Mean ± SD	No n (%)/ Mean ± SD
<b>Age (years)</b>					
Child's Age	100	4.1 ± 3.6 <i>t=0.118;p-value=0.906</i>	4.2 ± 3.4	3.8 ± 2.9 <i>t=0.495;p-value=0.622</i>	4.3 ± 4.0
Parent's Age	100	38.3 ± 6.7 <i>t=2.093;p-value=0.039*</i>	35.2 ± 7.1	37.3 ± 7.0 <i>t=0.376;p-value=0.708</i>	36.8 ± 7.0
<b>Category of parent</b>					
Father	36	24 (66.7)	12 (33.3)	20 (55.6)	16 (44.4)
Mother	64	34 (53.1)	30 (46.9)	29 (45.3)	35 (54.7)
		<i>X<sup>2</sup>=1.734;p-value =0.188</i>		<i>X<sup>2</sup>=0.967;p-value =0.325</i>	
<b>Sex of child</b>					
Male	73	47 (64.4)	26 (35.6)	40 (54.8)	33 (45.2)
Female	27	11 (40.7)	16 (59.3)	9 (33.3)	18 (66.7)
		<i>X<sup>2</sup>=4.523;p-value=0.033*</i>		<i>X<sup>2</sup>=3.633;p-value =0.057</i>	
<b>Parent's Marital status</b>					
Single	6	3 (50.0)	3 (50.0)	3 (50.0)	3 (50.0)
Married	87	51 (58.6)	36 (41.4)	43 (49.4)	44 (50.6)
Sep/Div/Wid	4	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)
		<i>Fisher's exact=0.520; p-value =0.888</i>		<i>Fisher's exact =0.209; p-value =1.000</i>	
<b>Educational level</b>					
Nil	6	3 (60.0)	2 (40.0)	3 (60.0)	2 (40.0)
Primary	8	4 (50.0)	4 (50.0)	4 (50.0)	4 (50.0)
Secondary	25	15 (60.0)	10 (40.0)	12 (48.0)	13 (52.0)
Tertiary	62	36 (58.1)	26 (41.9)	30 (48.4)	32 (51.6)
		<i>Fisher's exact=0.444; p-value =0.963</i>		<i>Fisher's exact =0.414; p-value =0.983</i>	
<b>Employment</b>					
Employed	63	40 (63.5)	23 (36.5)	34 (54.0)	29 (46.0)
Unemployed	33	17 (51.5)	16 (48.5)	14 (42.4)	19 (57.6)
Student	4	1 (25.0)	3 (75.0)	1 (25.0)	3 (75.0)
		<i>Fisher's exact=3.059; p-value =0.220</i>		<i>Fisher's exact =2.043; p-value =0.338</i>	

SD – Standard deviation    Sep/Div/Wid – Separated/Divorced/Widowed

*\*Statistically significant ( $P < 0.05$ )*

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**Table 3: Comparison of demographic/clinical related factors by parental anxiety and depression (continuation)**

Variables	N	Parental Anxiety		Parental Depression	
		Yes n (%)/ Mean ± SD	No n (%)/ Mean ± SD	Yes n (%)/ Mean ± SD	No n (%)/ Mean ± SD
<b>Number of children</b>	100	2.8 ± 1.3	2.4 ± 1.2	2.9 ± 1.4	2.36 ± 1.0
		<i>t=1.440;p-value=0.153</i>		<i>t=2.209;p-value=0.030*</i>	
<b>Income (NGN) (N=87)</b>					
<30,000	33	22 (66.7)	11 (33.3)	17 (51.5)	16 (48.5)
30,000-50,000	21	11 (52.5)	10 (47.6)	10 (47.5)	11 (52.4)
50,000-100,000	20	15 (75.0)	5 (25.0)	13 (65.0)	7 (35.0)
>100,000	13	7 (53.8)	6 (46.2)	6 (46.2)	7 (53.8)
		<i>X<sup>2</sup>=2.914;p-value =0.405</i>		<i>X<sup>2</sup>=1.673;p-value =0.660</i>	
<b>Type of surgery</b>					
Elective	96	54 (56.2)	42 (43.8)	45 (46.9)	51 (53.1)
Emergency	4	4 (100.0)	0 (0.0)	4 (100.0)	0 (0.0)
		<i>Fisher's exact =4.478; p-value =0.034*</i>		<i>Fisher's exact p-value =0.054</i>	
<b>Use of general anesthesia</b>					
Yes	85	48 (56.5)	37 (43.5)	39 (45.9)	46 (54.1)
No	15	10 (66.7)	5 (33.3)	10 (66.7)	5 (33.3)
		<i>X<sup>2</sup>=0.544;p-value =0.461</i>		<i>X<sup>2</sup>=2.204;p-value =0.138</i>	

NGN – Nigerian Naira SD – Standard deviation \*Statistically significant ( $P < 0.05$ )

**Table 4: Logistic regression analysis showing relationship between demographic/clinical related factors and parental anxiety and depression**

Independent variables**	Parental Anxiety		Parental Depression	
	<i>B</i>	AOR (95% CI)	<i>B</i>	AOR (95% CI)
<b>Age of child</b>	-0.041	0.960 (0.739 – 1.247)	0.047	1.048 (0.743 – 1.217)
<b>Age of parents</b>	-0.104	0.902 (0.768 – 1.058)	-0.051	0.951 (0.894 – 1.228)
<b>Category of parent</b> Father/Mother	-1.004	0.366 (0.059 – 2.269)	0.135	1.145 (0.182 – 7.202)
<b>Sex of child</b> (Male/Female)	0.324	1.383 (0.202 – 9.457)	-0.267	0.766 (0.097 – 6.047)
<b>Parents Marital</b> (Unmarried/Married)	0.972	2.644 (0.221 – 31.599)	1.263	3.537 (0.204 – 61.285)
<b>Educational level</b>	0.065	1.067 (0.376 – 3.029)	0.830	2.292 (0.740 – 7.105)
<b>Number of children</b>	-0.683	0.505 (0.258 – 0.991)*	-1.128	0.324 (0.140 – 0.752)*
<b>Income</b>	0.422	1.525 (0.616 – 3.781)	-0.240	0.787 (0.318 – 1.945)
<b>General anesthesia</b> (Yes/No)	-1.609	0.200 (0.011 – 3.578)	-3.826	0.022 (0.001 – 0.701)*

AOR – Adjusted odds ratio CI – Confidence Interval \*Statistically significant ( $P < 0.05$ )

\*\*Type of surgery (elective/emergency) was excluded from the model as the assumptions for logistic regression analysis was unmet